



FP/S-38-26205

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

Yoshiaki YOKOO et al.

Application No. 10/076,657

Filing Date: 02/19/2002

For: Processed mango juice and beverage containing it

Examiner: BECKER, DREW E

Group Art Unit:1761

**DECLARATION UNDER 37 CFR 1.132**

Honorable Commissioner of Patents and Trademarks,  
Washington, D.C. 20231

Sir,

I, Yoshiaki YOKOO, a Japanese citizen, c/o Suntory Limited, 1-40, Dojimahama 2-chome, Kita-ku, Osaka-shi, Osaka 530-8203, Japan, hereby declare that I am one of the inventors of the above-entitled patent application and that I received a Master's degree from Tokyo University of Science, Faculty of Science and Technology in March 1990.

I declare also that I have been employed by Suntory Limited, the assignee of this application, and have been engaged in food product research and pharmaceutical product research since April 1990 and that I work as a general manager of Beverage product department of R&D Division of Suntory Limited.

I declare further that I have read all of the Office Actions relative to the above-entitled patent application, and have read and am familiar with each of the references cited in the Office Actions cited by the Examiner.

I declare further that I am familiar with the subject matter disclosed in the

application as well as the disclosures in the references cited against the claims, including Chen et al. (U.S. Pat No. 5,756,141), XP-002201947 (Vailliant et al, "Strategy for economical optimisation of the clarification of pulpy fruit juices using crossflow microfiltration," journal of Food Engineering 48(1) 83-90 2001), DE 20102826 and Wu et al. (U.S. Pat No. 5,468,508).

I declare that the following experiment was conducted under my direction and supervision and that the results are true and correct to the best of my knowledge.

## **Experiment**

### **1. Method**

Mango juice was treated with a microfiltration membrane (MF) and an ultrafiltration membrane (UF). The pore size of the MF was  $0.45\ \mu\text{m}$  (standard MF size) and the molecular cut-off of the UF was 50,000 (standard UF size). Since straight mango juice is exceptionally rich in pulp, it was not possible to treat it directly with either the MF or the UF. Thus, a pulp-reduced type of mango juice (Japan Fruit Processing co. Ltd), i.e. mango juice in which pulp has been reduced by centrifugation, was employed in this experiment. For each sample (pulp-reduced type of mango juice, the MF treated mango juice and the UF treated mango juice), Brix and turbidity were analyzed. Further, a photograph of all samples was taken with turbidity standard samples.

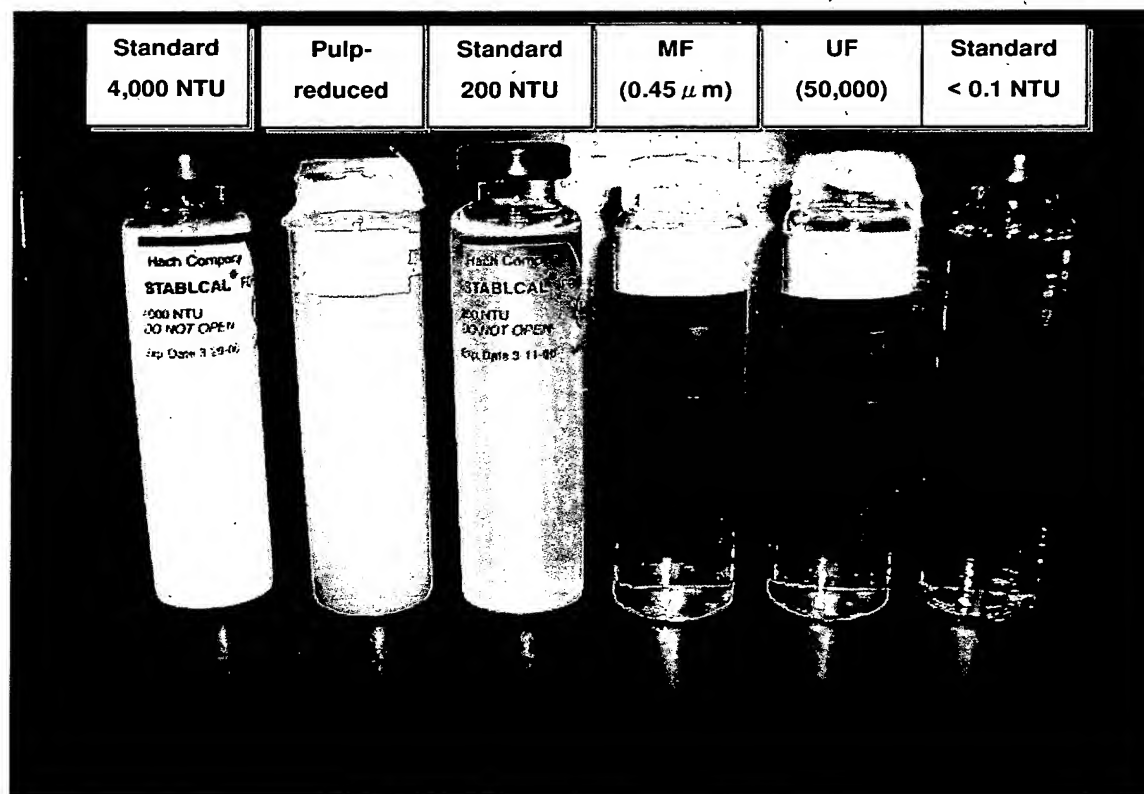
## 2. Results

The results are shown in the following Table 1 and Fig. 1.

Table 1

Fruit	Type	Main Process	Brix	Turbidity (NTU)	Turbidity (NTU) at straight juice (Brix13)
Mango	Pulp-reduced	Centrifugation and dilution with water	8.67	1791	2685
Mango	MF	Micro filtration	8.42	5.80	8.95
Mango	UF	Ultra filtration	8.34	4.47	6.97

Fig. 1



### **3. Conclusion**

The important findings in this experiment are:

- (1) The turbidity of clear-type (MF) Mango juice was much lower [ $< 10$  (NTU)] than control (pulp-reduced); and
- (2) The turbidity of clear-type (UF) Mango juice was much lower [ $< 10$  (NTU)] than control (pulp-reduced).

### **4. Discussion**

Generally, turbidity of sample has dropped down in following order:

Centrifugation > Microfiltration > Ultrafiltration > Nanofiltration > Reverse osmosis.

The results of this experiment were not inconsistent with this order.

Regarding fruit juice, clear-type fruit juices are generally produced by using ultrafiltration (UF), microfiltration (MF), or diatomite filtration, and a turbidity of such a produced juice is less than 10 NTU, as stated in the previous declaration. Since, Chen et al disclose methods comprising a UF or MF process, and a clear-type fruit juice produced by using those methods, the juice of Chen et al, which are produced by using UF or MF, can be recognized to have a turbidity similar to the test results shown in this and in previous declarations (i.e. less than 10 NTU).

Besides, Chen et al stated, as to a filter pore size of a UF membrane suitable for their methods, that the pore size is "sufficiently large for soluble color components to pass through the membrane" (column 8, line 1). However, it should be noted that color and turbidity do not correlate directly, and that soluble color components do not increase a turbidity of the filtrate solution since they are dissolved in the solution. The size stated by Chen et al can be understood to be within the range that can be worked as UF. The description does not mean at all

that the pore size of the UF membrane is large enough to pass insoluble solid components that will increase the turbidity of filtrate. In addition, Chen et al also states that the pore size is also "sufficiently small enough to retain pectin, other suspended solids and microbes as needed for permeate clarification" in the paragraph following the statement quoted above.

Consequently, the turbidity of the processed mango juice of the present invention, above 2,000 NTU, is significantly higher than that of a prior art clear-type fruit juice, including the juice of Chen et al.

I declare further that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

Dated this 16<sup>th</sup> day of August, 2006

Yoshiaki YOKOO

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